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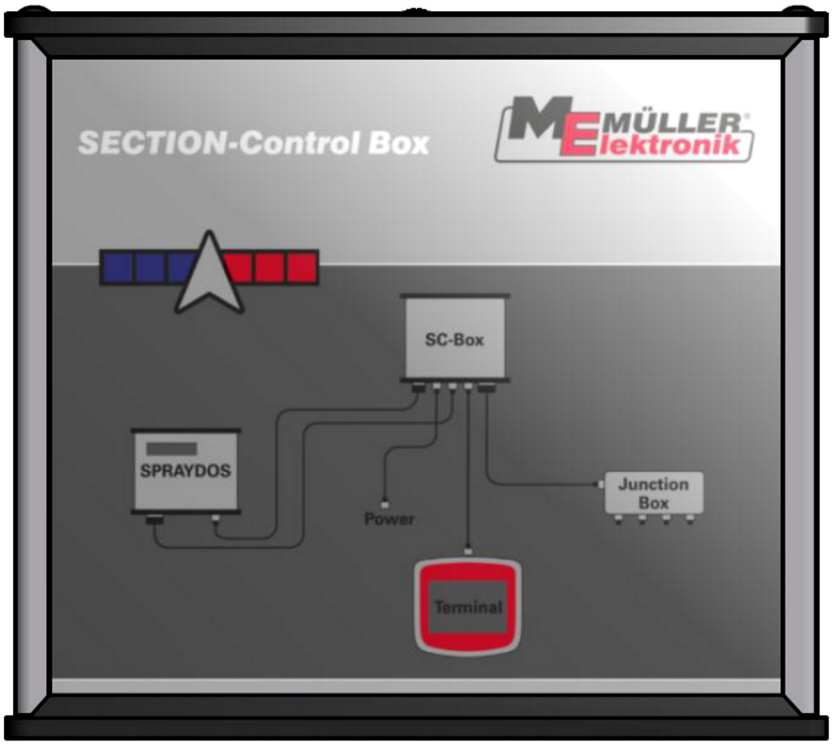
Operating Instructions

SECTION-Control Box



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30302670-02-US

Read and follow this operating instructions.

Keep this operating instructions for future reference.

Legal notice

Document

Operating Instructions
Product: SECTION-Control Box
Document number: 30302670-02-US
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1 For your safety

1.1 Basic safety instructions

- Before you leave the vehicle cabin, ensure all automatic mechanisms are deactivated or manual mode is activated.
- Keep children away from the trailer device and from the job computer.
- Do not make any unauthorized modifications to the product. Unauthorized changes or unauthorized use may impair your safety and influence the lifespan or function of the product. Modifications are considered unauthorized if they are not described in the product documentation.
- Never remove any safety mechanisms or stickers from the product.
- Carefully read and follow all safety instructions in this operating guide and in the sprayer operating instructions.
- Observe all applicable regulations on accident prevention.
- Follow all recognised safety, industrial and medical rules as well as all road traffic laws.
- Before charging the tractor battery, always disconnect the tractor from the job computer.
- Use only clear water when you are testing the sprayer. Do not use a poisonous spray during the tests or when calibrating the systems.

1.2 Layout and meaning of warnings

All safety instructions found in these Operating Instructions are composed in accordance with the following pattern:

⚠ WARNING

This signal word identifies medium-risk hazards, which could potentially cause death or serious bodily injury, if not avoided.

⚠ CAUTION

This signal word identifies low-risk hazards, which could potentially cause minor or moderate bodily injury or damage to property, if not avoided.

NOTICE

This signal word identifies actions which could lead to operational malfunctions if performed incorrectly.
These actions require that you operate in a precise and cautious manner in order to produce optimum work results.

There are some actions that need to be performed in several steps. If there is a risk involved in carrying out any of these steps, a safety warning will appear in the instructions themselves.

Safety instructions always directly precede the step involving risk and can be identified by their bold font type and a signal word.

Example

1. **NOTICE! This is a notice. It warns that there is a risk involved in the next step.**

2. Step involving risk.

1.3 Layout and meaning of alert messages

While working with the sprayer, an alarm message may appear.

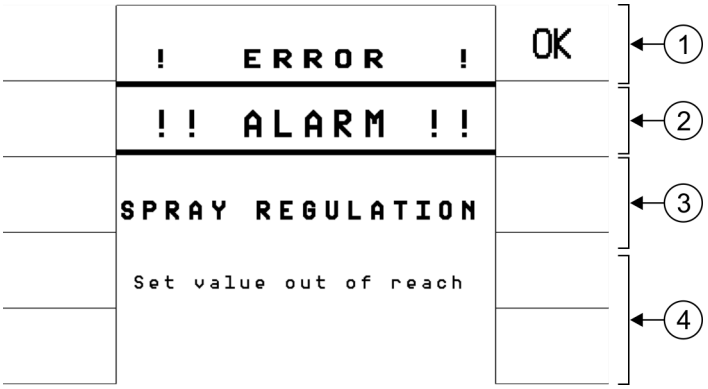
Purpose

The alarm messages have the following purpose:

- **Warn** – They warn the operator if the current state of the sprayer could lead to a dangerous situation.
- **Inform** – They inform the operator that the current state of the sprayer or the configuration is not correct and can lead to faults in operation.

Illustration

On the following diagram, you can see how the alarm messages are structured:



Layout of alarm messages

1	Type of alarm	3	Name of the component that caused the alarm.
2	"ALARMS" message	4	Problem description and solution What the exact cause of an alarm message is or how you rectify a fault can be read in the section "Alarm messages [→ 48]"

Type of alarm

There are three types of alarm:

- Info
  The status of a sensor has changed. If applicable, you must do something.
- Error
  An error has occurred.
- Danger
  Faults that are dangerous. With these alarms, break off work immediately, find out the cause and rectify the problem.

1.4 User requirements

- Learn how to operate the display correctly. The display must not be operated by anyone who has not read the Operating Instructions.
- Please read and carefully observe all safety instructions and warnings contained in these Operating Instructions and in the manuals of any connected vehicles and farm equipment.
- If there is anything within these Operating Instructions that you do not understand, please do not hesitate to contact us or your dealer. Mueller-Electronic's Customer Services department will be happy to assist you.

1.5 Intended use

The job computer is used to control sprayers in agriculture. The manufacturer shall not be held responsible for any installation or use that goes beyond this.

Intended use also includes the adherence to the conditions for operation and repairs prescribed by the manufacturer.

The manufacturer cannot be held liable for any personal injury or property damage resulting from such non-observance. All risk involved during improper use lies with the user.

All applicable accident prevention regulations and all other generally recognized safety, industrial, and medical rules as well as all road traffic laws must be observed. Any unauthorized modifications made to the unit will void the manufacturer's warranty.

1.6 Disposing of the unit

When it has reached the end of its service life, please dispose of this product as electronic scrap in accordance with all applicable EU waste management directives.

2 About these Operating Instructions

2.1 Target group of these Operating Instructions

These Operating Instructions is intended for those who are involved in these works:

- Installation and configuration of SECTION-Control Box
- Control of a sprayer with SECTION-Control Box

2.2 Applicability

These Operating Instructions apply to these products:

Product	Article number	Version higher than:
SECTION-Control Box	30302670	SPRECO1: V711a

2.3 Illustrations in these operating instructions

The role of the diagrams on the software interface is to serve as a reference. They help you in finding your way around the software screens.

The information shown on the screen is dependent on various factors:

- the type of the sprayer,
- the configuration of the sprayer,
- the condition of the field sprayer.

For this reason the diagrams in these operating instructions may show different information from the terminal.

2.4 Layout of operating instructions

The operating instructions explain step by step how you can perform certain operations with the product.

We use the following symbols throughout these Operating Instructions to identify different operating instructions:

Type of depiction	Meaning
1. **2.**	Actions that must be performed in succession.
⇨	Result of the action. This will happen when you perform an action.
⇨	Result of an operating instruction. This will happen when you have completed all steps.
☑	Requirements.

Type of depiction	Meaning
	In the event that any requirements have been specified, these must be met before an action can be performed.

2.5 Layout of references

If any references are given in these Operating Instructions, they will appear thus:

Example of a reference: [➞ 10]

References can be identified by their square brackets and an arrow. The number following the arrow shows you on what page the chapter starts where you can find further information.

3 Product description

3.1 Scope of delivery

The following items are included in delivery:

- Job computer SECTION-Control Box (from now also: SC-Box)
- Installation and Operating Instructions
- Bracket for installation

3.2 System requirements

For the system to work correctly, the following conditions must be fulfilled:

- Display from Mueller-Electronics, from software version 3.90
- On-board computer Spraydos from Mueller-Electronics or a manufacturer-specific option. You will obtain precise information about the on-board computers compatible with the SC-Box from your manufacturer.

When you want to use the SC-Box together with SECTION-Control:

- Plugin "TRACK-Leader" must be activated.
- Activate the "TaskManager" plugin.
- License "TRACK-Leader II" must be activated.
- License "SECTION-Control" must be activated.

3.3 Information on the nameplate

On the job computer you will find a manufacturer's plate in the form of a sticker. On this sticker you can find all the information you need to clearly identify the product.

Have these details ready when you contact Customer Services.

Manufacturer's nameplate on the side of the job computer

1	**Item name**	4	**Hardware version**
2	**Serial number**	5	**Customer number** If the product was manufactured for an agricultural machinery manufacturer, the agricultural machinery manufacturer's item number will be shown here.
3	**Software version** If you update the software, this version will no longer be up-to-date.	6	**Operating voltage** The product may only be connected to voltages within this range.

3.4 Connectors on the SC-Box

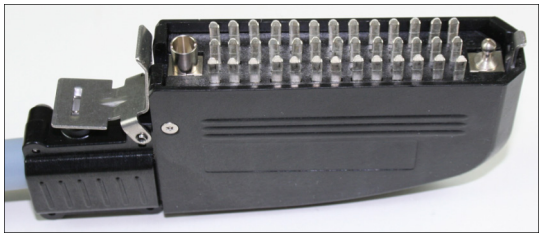
Bottom side of SC-Box with article number 30302670

1	Cable to display	4	Screen
2	Socket for voltage supply cable to on-board computer	5	Socket for wheel sensor
3	39-pole plug Output for signals. Connect to the on-board computer.	6	Socket for junction box Input for signals.
		7	Connection to voltage supply

The cable and socket arrangement on the bottom side of the SC-Box can vary. The amount and arrangement of cables will be adjusted to the on-board computer type. Check the plug to see what a cable is intended for and where it shall be connected.

Signal plug for connection to on-board computer

The signal plug for connection to the on-board computer can look different depending on the article number of the SC-Box and on-board computer type.



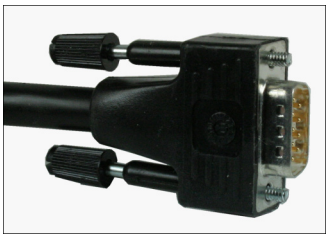
39-pole signal plug for connection to on-board computer

Plug for connection to voltage supply

Permitted voltage supply can be found in chapter "Technical data“ [➞ 46].

Voltage supply

Plug for connection to the display

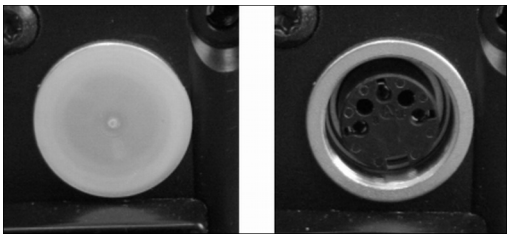


D-Sub plug

Socket for wheel sensor

Only connect a wheel sensor to the socket when it is not connected to the junction box. The rule is that you must connect the wheel sensor to the SC-Box when you control a self propelled sprayer.

The wheel sensor socket is covered with a dust protection cap.



Left: socket with dust protection cap; Right: socket without dust protection cap

The socket is absent for these on-board computers:

- Dammann on-board computer

Socket for voltage supply cable to on-board computer

This socket is intended for sending the supply voltage further to the on-board computer.

Socket for junction box

The amount of pins in this socket depends on the SC-Box model and must fit your junction box.

4 Installation

4.1 System overview

You will find the system overview on the sticker on the CS-Box casing.

4.2 Mounting the SC-Box in the tractor cab

For mounting the SC-Box in the tractor cabin you can use the holder which is included in the delivery scope and the holder bracket on the SC-Box rear side.

The SC-Box does not require any control. Therefore, mount it in a place in which it does not disturb the driver.

4.3 Connecting the SC-Box

You will see how to connect the SC-Box with the on-board computer in the drawing on the SC-Box and in the drawing in chapter System overview [➞ 14].

Procedure

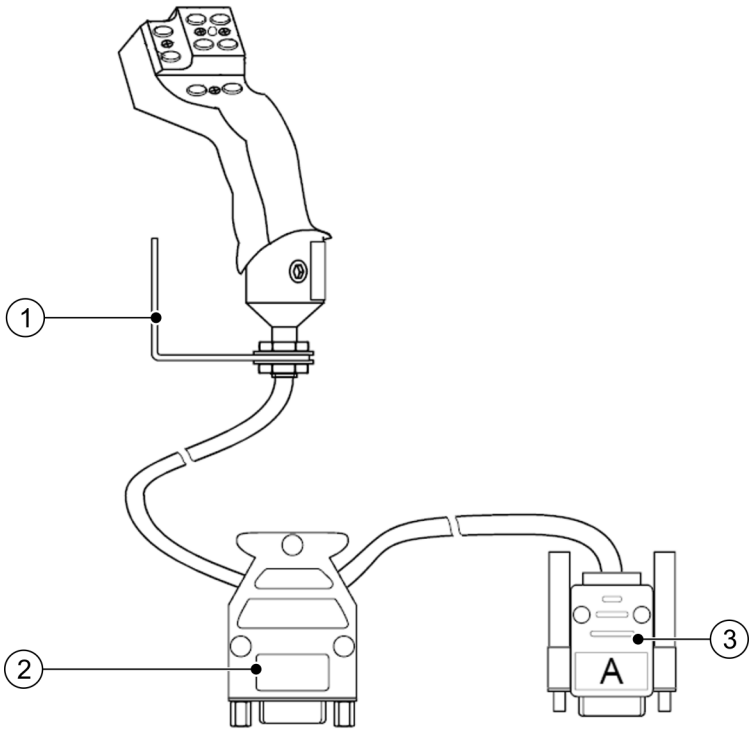
1. Disconnect the voltage supply to the on-board computer (SPRAYDOS).
2. Connect the voltage supply cable of the on-board computer to the voltage supply socket on the SC-Box.
3. Clamp the signal plug out of the junction box (the label says Junction Box) of the job computer.
4. Connect the signal plug to the SC-Box.
5. Connect the signal plug coming out of the SC-Box to the on-board computer.
6. Connect the SC-Box to a display from Mueller-Electronics.
7. Connect the voltage supply cable of the SC-Box to voltage supply.
8. Switch on the on-board computer.
   - ⇨ The on-board computer boots up.
   - ⇨ The display boots up.
   - ⇨ The SC-Box application will be loaded on the display.

⇨ You have connected the SC-Box correctly.

4.4 Fitting multi-function joystick (MFG)

The joystick can be additionally connected to the display.

Read the following chapter to learn which functions you can control with the joystick: Multi-function joystick button assignment [➞ 47]



Connecting the joystick

1	Mounting angle For attachment in the cabin	3	Plug for connection to the display
2	Socket for connection to the SC-Box		

Procedure

You fit the joystick as follows:

1. Fit the joystick next to the driver on the right within driver's reach.
2. Plug in the D-sub socket of the SC-Box to the joystick socket.
3. Plug in plug A of the joystick to socket A on the display.
   ⇨ The joystick now connects the SC-Box with the display.

⇨ When the display is switched on, the LED on the joystick lights up.

4.5 Connecting the wheel sensor

Wheel sensor (also called Sensor X) is a sensor that determines the speed of the vehicle.

You will find the installation guide to the wheel sensor in the installation guide to the on-board computer.

Connect the wheel sensor to the SC-Box only after the wheel sensor had been connected to the on-board computer.

For on-board computers of the Dammann company connected to the SC-Box with a 64-pole plug, you do not have to connect the wheel sensor separately.

Procedure

This is how you connect the wheel sensor to the SC-Box:

1. Remove the dust protection cap on the SC-Box bottom side.
2. Connect the wheel sensor to the SC-Box:

5 Basic control principles

5.1 What changes for you

If you have controlled your sprayer with an on-board computer until now – e.g. SPRAYDOS, then you need to make some changes after you have installed the SC-Box.

The following functions can no longer be controlled with the on-board computer:

- All functions controlling the spreading:
  - Setting rate
  - Regulate spread rate

5.2 What does not change for you

You can continue using your on-board computer for the following functions:

- All functions controlled hydraulically:
  - Raise boom
  - Lower boom
  - Slope boom
  - etc.
- Control of sections
  - Opening and closing of separate section valves
  - Opening and closing section main switch

    When using the SECTION-Control application in automatic mode, you need not switch the sections manually.
- Spraying pressure indication

5.3 Switching job computer on and off

Procedure

You can switch on the job computer as follows:

1. Switch on the on-board computer.
   ⇨ The display will switch on.
   ⇨ The LED on the joystick begins to light up.

⇨ You have switched on the job computer.

Procedure

You can switch off the job computer as follows:

1. Switch off the on-board computer.
   ⇨ The display will switch off.
2. Wait until the LED on the joystick goes out.

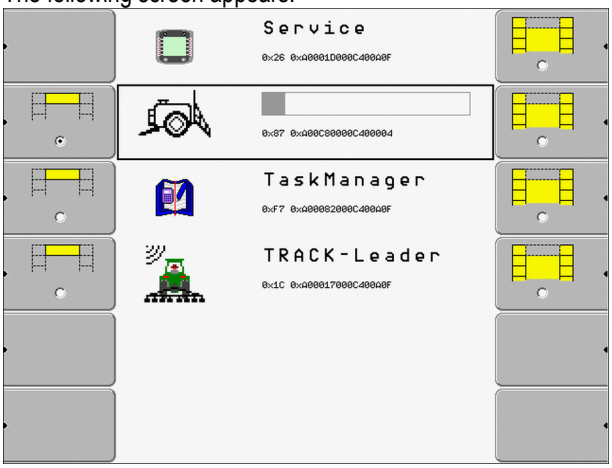
⇨ You have switched off the job computer.

5.4 Initial start-up

Once the job computer is fitted, installed and connected to the display, you can start it up for the first time.

Procedure

1. Switch on the on-board computer.
   ⇨ The display switches on automatically along with the on-board computer.
   ⇨ The job computer will be switched on together with the display.
2. - Call the "Selection Menu" application on the display.
   ⇨ The following screen appears:



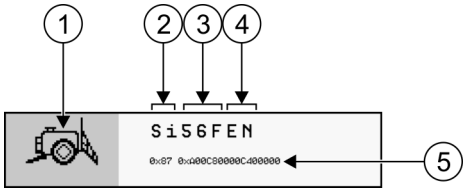
   ⇨ The job computer will be loaded from the display. You will see the progress display next to the Job Computer Sprayer application icon.
   ⇨ The job computer has been started once the name of the job computer appears next to the sprayer icon.
3. Start the Job Computer Sprayer application. [➞ 17]
4. Configure the SC-Box job computer. [➞ 25]

Read next:

- Configuring the on-board computer [➞ 24]
- Configuring the job computer SECTION-Control Box [➞ 25]

5.5 Job computer in the display selection menu

The SC-Box job computer logs on in the "Selection Menu" application as the job computer sprayer.

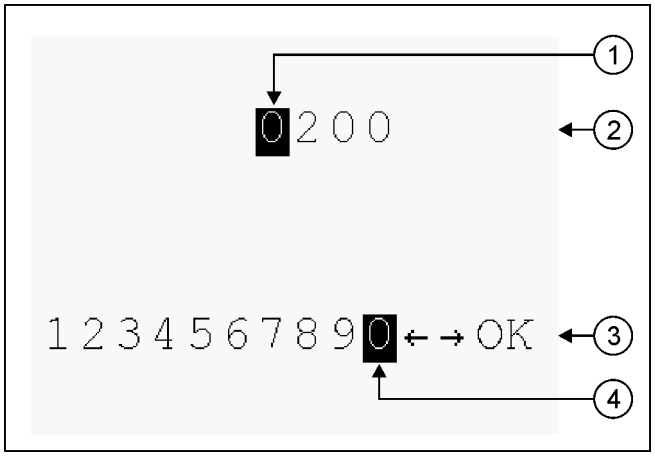


Job computer during registration in the selection menu

1	**Job Computer Sprayer application icon**	4	**Language**
2	**Type of job computer** "s" stands for sprayer	5	**Hardware serial number** Using this number the job computer can identify itself in other applications. For example in the Farm Management Information System. More on this: [→ 28]
3	**Version of the object pool** The object pool is the part of the software that contains images and text. You can learn how to check the full software version in the section: Checking the software version [→ 46]		

5.6 Inputting data

In this section you learn how to enter data when the data input screen appears.



Data input screen

1	**Cursor 1** On the input field mark the position where a new number should be entered.	3	**Numbers for selection**
2	**Input field** Contains number fields for entering a value.	4	**Cursor 2** Selects a number to be entered in the input field.

Procedure

Enter a number as follows:

☑ You have called up the data input screen.

☑ Cursor 1 marks the position in the input field where a new number will be entered.

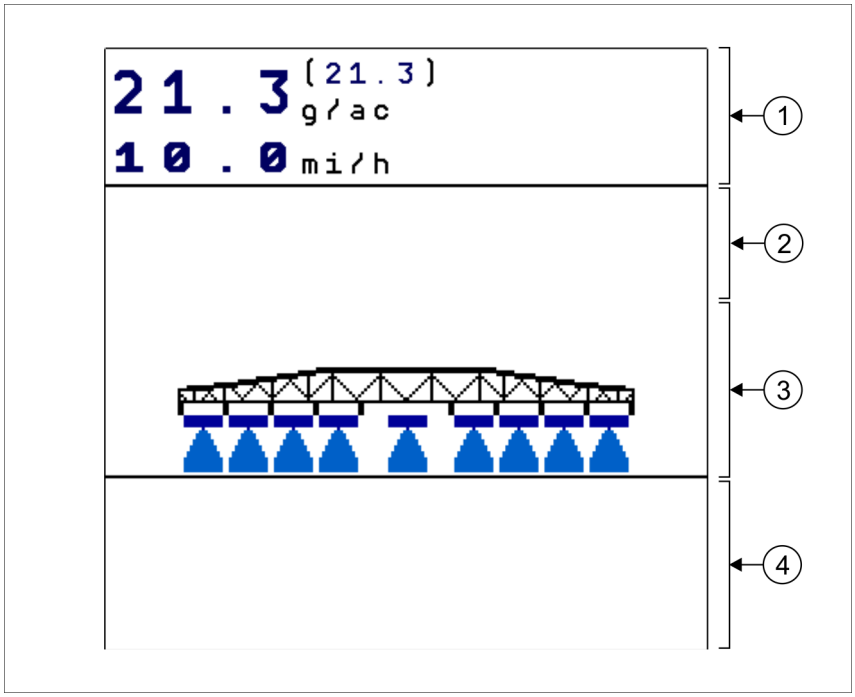
1. Mark the desired number with cursor 2.
2. Click on the marked number.
   ⇨ The number clicked appears in the input field.
   ⇨ Cursor 1 moves one field to the right
3. Set additional numbers.
4. Highlight and click on "OK" to terminate the input and apply it.

5.7 Screen structure

5.7.1 Work screen with a sprayer

The work screen is always displayed during work and contains the most important information. The work screen informs you about the status of the sprayer during work.

The work screen is divided into four areas.



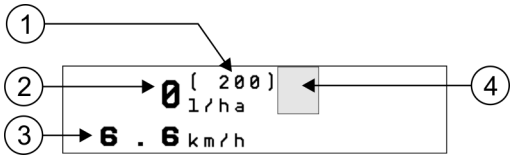
Areas on the work screen

1	**"Spray data"** area	3	**"Boom display"** area
2	Selectable area 1	4	Selectable area 2

You can read about the information that appears in these areas in the following sections.

5.7.2 Spray data area

The following information is shown in this area:



Spray data area

1	**Rate** Specified application rate in l/ha.	4	**Additional icons**
2	**Actual value** Current application rate in l/ha.	5	**Spray pressure** Current pressure of the sprayed liquid in psi (only when the pressure sensor is configured).
3	**Speed** Current speed of the sprayer in mph.		

Icons

5.7.3 Selectable area 1

This area has two pages:

- Page with information about the activated functions.
- Page with counters

Controls

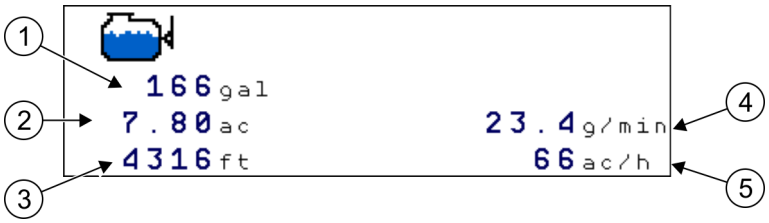
- Switch between page 1 and page 2

Information on page 1

No information appears on page 1.

Information on page 2

The following diagram shows the information that can appear in this area:



Selectable area 1: Page 2

1	**Current tank content** Depending on the sprayer equipment, this will show either the calculated or measured tank content.	4	**Flow rate per minute** Flow rate through the main flow meter.
2	**Workable area** With the current tank content and the current spread rate, the area shown here can still be processed.	5	**Area output / hour**
3	**Workable distance** Under the current conditions, this distance can still be processed.		

5.7.4 Boom display area

In the boom display you find the following information:

- Number of sections
- Which sections have been preselected or switched off
- Which sections are spreading

Possible states

The sections can be in three states.

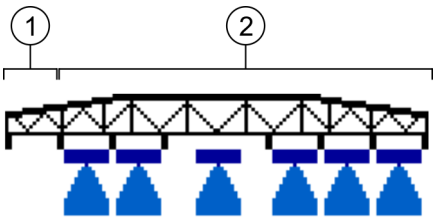
You can read a section's state in the work screen in the boom display area.

Following section states are possible:

Display	Section state
	Section is switched off.
	Section is preselected. Section is ready for spreading.
	Section is preselected and the main section switch is switched on. Section is applying.

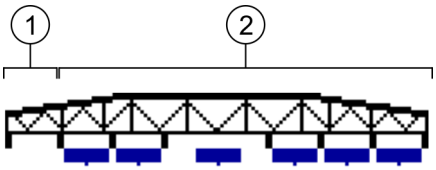
Illustration

The following diagrams show how the sections in the boom display area may look:



Boom display area – example 1

1	**Section 1** is switched off.	2	**Sections 2 to 7** are preselected and applying.



Boom display area – example 2

1	**Section 1** is switched off.	2	**Sections 2 to 7** are preselected but are not applying.

5.8 Switching between joystick and on-board computer

As you use the SC-Box, you can control the sections and main switch with these units:

- With on-board computer switches
- With the joystick or display keys

Procedure

This is how you change the unit used for section control:

1. Call the start screen on the display.
2. - press.

   ⇨ - appears in the work screen. You can control the sections with the on-board computer switches.

3. - press.
   ⇨ - will be hidden out. You can control the sections with the joystick keys or keys on the display.

5.9 Operating the multi-function joystick

With the multi-function joystick you can activate and deactivate the sprayer functions.

For example:
- Switching on main sections switch
- Switching off sections from left to right
- Raising and lowering boom manually

The button assignment is dependent on:
- Sprayer model
- Configuration of the sprayer

At the end of the operating instructions you will find a loose sticker with the multi-function joystick configuration on it.

Mode of operation

Three functions are assigned to each button on the multi-function joystick. Which function is executed when a button is pressed depends on the position of the side switch.

Position of the switch	Color of the LED
	Red
	Yellow
	Green

Procedure

The multi-function joystick is operated as follows:

☑ The work screen is called up.

1. Bring side switch into the desired position and fasten.
   ⇨ The LED on the multi-function joystick lights in the corresponding color.
2. Press button with the function desired.
   ⇨ Function will be activated.
3. To terminate the function, release pressed button and the side switch.

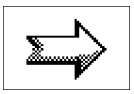
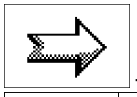
5.10 Controlling the SC-Box with display keys

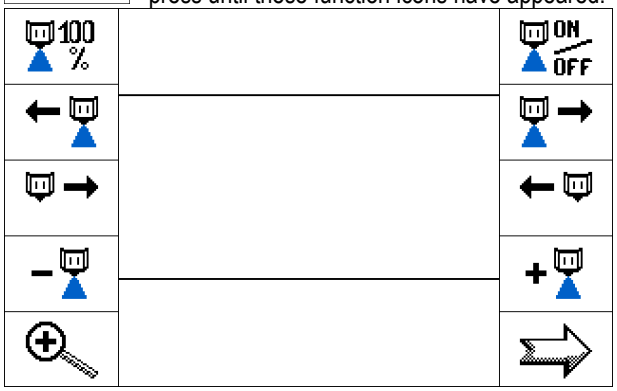
If you do not have any joystick on the sprayer or should the joystick fail, you can also control the spraying functions with additional keys in the work screen.

Procedure

This is how you control the SC-Box with the keys on the display:

1. In menu "Activate options“ set the value of the "Joystick type“ parameter to "without joystick“. [➞ 28]
2. Restart the job computer.

   ⇨ After restart, this function icon appears in the work screen: 
3.  - press until these function icons have appeared:



4. Use function keys in accordance with the operating instructions.

6 Configuring the on-board computer

As the SC-Box takes over the spread rate control function, many functions and settings on the on-board computer are redundant.

If you fit an existing system with the SC-Box, you can write down the sprayer parameters from the on-board computer and use them as the base for SC-Box configuration.

You can keep these functions as they are, deactivate them and/or set them to 0. Anyway, the SC-Box will ignore them.

A lot of settings on the on-board computer are redundant and will be replaced by new settings on the job computer. The following table shows an overview of replaced and new functions.

Icon on on-board computer	Function	Value in on-board computer (here you can enter the value)	Read this chapter
	Rate		Entering sprayer parameters [➞ 25]
	Impulses/100m		Calibrating the wheel sensor [➞ 33]
	Amount of sections		Entering the number of sections [➞ 35]
	Swathwidth		Entering sprayer parameters [➞ 25]
	Impulses/liter		Calibrating flow meter [➞ 29]
	Regul. factor		Entering sprayer parameters [➞ 25]
	Manifold type		Setting manifold type [➞ 28]

7 Configuring the job computer SECTION-Control Box

7.1 Entering sprayer parameters

When to enter?

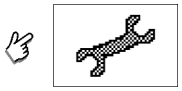
Enter the parameters in the following cases:

- Prior to initial startup.
- When the sprayer parameters change.

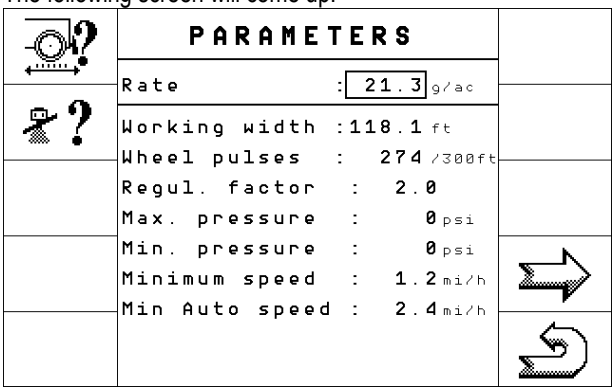
Procedure

This is how you change the value of a parameter:

1. Switch to the "Parameters" screen:



⇨ The following screen will come up:


PARAMETERS
Rate : 21.3 g/ac
Working width : 118.1 ft
Wheel pulses : 274 /300ft
Regul. factor : 2.0
Max. pressure : 0 psi
Min. pressure : 0 psi
Minimum speed : 1.2 mi/h
Min Auto speed : 2.4 mi/h

2. Click on the line with the desired parameter.
   ⇨ The data input screen appears.
3. Input desired value.
4. Highlight and click on "OK" to terminate the input and apply it.
   ⇨ The new value appears in the "Parameters" screen.

List of parameters

The list contains all parameters that can appear on the screen. Which parameters appear on your screen depends on the type and configuration of your sprayer.

Rate

The volume entered as the rate will be applied when the sprayer is working in automatic mode.

Working width:

Sprayer working width.

Wheel pulses

Number of pulses the wheel sensor sends to the job computer on a 300ft route. Used to calculate speed.

The number is determined by the wheel sensor calibration.

Regul. factor

In Automatic mode the spray pressure of the nozzles will be adapted to the current speed of the sprayer. The adaption should ensure that the volume of spray liquid that is spread is exactly what you defined in the rate. In this the regul. factor plays a decisive role.

The regul. factor adjusts the control speed:

- The higher the regul. factor, the faster the spray pressure is adjusted.
- The lower the regul. factor, the more slowly the spray pressure is adjusted.

When setting the regul. factor, take note of the following:

- If, during movement at constant speed, the current spread volume jumps around the target value, you need to reduce the regul. factor.
- If, when speed is changing, the spread volume does not adjust to the rate quickly enough, you need to increase the regul. factor.

Setting limit values for the spray pressure

This includes the following parameters:

- Max. pressure
- Min. pressure

This setting defines a spray pressure range within which the spray pressure is optimal.

If the spray pressure drops below the minimum or rises above the maximum limit value, an alarm will be triggered.

You can decide yourself what limit values you want.

If no pressure sensor is installed on your sprayer, you must deactivate this function as follows:

- Enter value 0 in the min. pressure line.
- Enter value 0 in the max. pressure line.

The SC-Box ignores these parameters.

Minimum speed

Minimum work speed

If the sprayer falls below the minimum work speed, the following happens:

- Spreading will be switched off automatically.
- The work screen displays the icon:

Min Auto speed

Minimum auto speed

If the sprayer falls below the minimum automatic speed, the following happens:

- The spray pressure control will be switched off automatically.
- Manual mode will be activated.
- The work screen displays the icon:

When the value is set to 0, this function is deactivated.

This parameter must be higher or the same as the parameter "Minimum speed".

Tank size

Size of the tank for the spray liquid.

Tank level alarm

Tank alarm rest volume

When the volume of spray mixture in the tank falls below this value, an alarm message appears on the screen.

Pulses main flow

Number of pulses the flow meter sends to the job computer per one gallon of liquid. Used to calculate the spread rate.

The number is determined by the flow meter calibration.

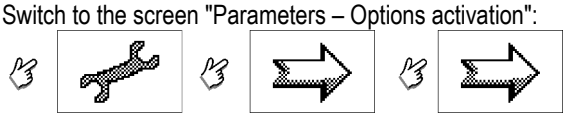
7.2 Options activation

You can activate several options on the job computer.

Procedure

You can activate the desired option as follows:

1. Switch to the screen "Parameters – Options activation":



2. Click on the desired option.
   ⇨ A list with possible options will appear.
3. Select desired option from the list.
4. Restart the job computer.

⇨ The selected option will be activated after the restart.

7.2.1 Setting sections switching type

- Sections switching
  Type and way in which sections are switched on and off.
  - "Sequential mode" [➝ 43]

    This type is intended for normal spraying work. It is also suitable for spraying on wedge-shaped areas and strips that are narrower than the working width of the sprayer.
  - "Localized mode" [➝ 43]

    This mode is designed for treating weed infestations. Sections can be switched individually and independently of one another.

7.2.2 Setting filling type

- Filling mode
  - "manual"

    For sprayers without TANK-Control.
  - "TANK-Control"

    For sprayers with TANK-Control.

7.2.3 Setting joystick type

- Joystick type
  - "Without Joystick"

    For the functions that are normally operated with the joystick, additional function icons appear on the terminal. The sprayer can be operated with the terminal buttons. The function icons appear in the work screen extension.

    The multi-function joystick can continue to be used.
  - "ME-Joystick"

    An "ME-Joystick" is connected to the terminal and to the SC-Box. The sprayer is operated with the joystick.
  - "Reject ME-Joystick"

    The joystick will be deactivated. If the user presses a button on the joystick, it will be ignored by the job computer.

7.2.4 Setting manifold type

- Manifold type
  - "Non constant pressure"

    For manifolds without the "Constant pressure" function.
  - "Constant pressure"

    For manifolds with the "Constant pressure" function.
  - "D-type"

    For sprayers that use a pneumatic regulator to regulate the pressure.

7.2.5 Establishing CAN connection type

This parameter defines the way the job computer communicates with the display and which information is sent in the process. The configuration depends on the type of display.

- CAN
  - "ME Eco"

    For ECO displays.
  - "ME ISO / no Serial No."

For ISOBUS displays. The serial number of the hardware will not be transferred and will not appear in the selection menu of the display.

– "ME ISO / Serial No."

For ISOBUS displays. The serial number of the hardware is transferred via CAN and appears in the selection menu of the display. Important for work with the "TaskManager" application.

7.3 Calibrating flow meter

When should you calibrate?

Because the number of pulses per gallon can change during the lifespan of a flow meter, calibration must be carried out in the following cases:

- Prior to initial startup.
- At the start of each season.
- When you detect deviations between the amount actually sprayed and the amount displayed.
- When you have exchanged or repaired the flow meter.

Methods

There are two ways you can calibrate the flow meter:

- The tank method – it is time-consuming, but precise.
- The nozzle method – it is not as precise as the tank method, but is less time-consuming.

NOTICE

Imprecise calibration
If the calibration is imprecise, the calculations will be very inexact and the spreading imprecise.

- Calibrate the flow meter very precisely.

7.3.1 Calibrating the flow meter with the tank method

Mode of operation

In the tank method a large quantity of water will be spread from the tank over a specific time.

The flow meter measures the pulses during this time.

After the spreading, you must enter the quantity of water that has been spread.

The computer works out the number of pulses per gallon.

⚠ CAUTION

Spray liquid or spray liquid residues
Danger of poisoning or burning

- Clean the spray liquid container thoroughly prior to calibration. The sprayer must be free of spray liquids or spray liquid residues.
- Use only clear water during calibration.
- Wear required protective equipment.

Procedure

☑ All sections are switched on.

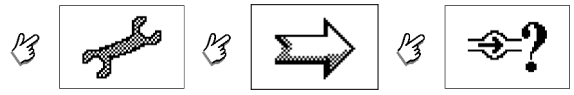
☑ Manual mode is activated (in the "Spray data" area of the work screen the icon appears).

☑ The tank is filled with clear water. For this you need several hundred liters of clear water.

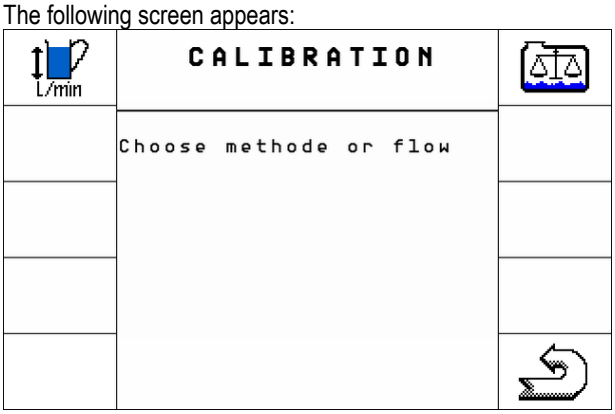
☑ You have the option of weighing the entire trailer or measuring the volume of water applied with another method.

☑ Pump is switched on.

1. Make sure that all preconditions are fulfilled!
2. Switch to the "CALIBRATION" screen:

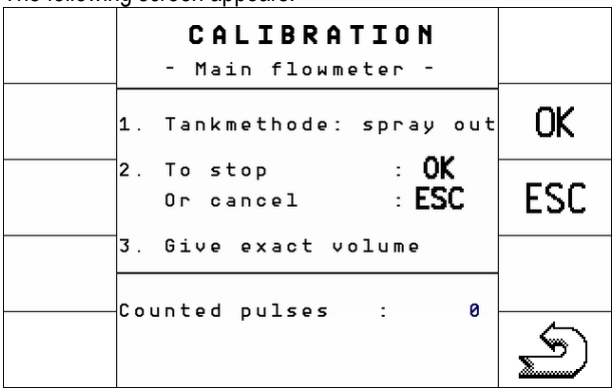


⇨ The following screen appears:



3. - Select tank method.

⇨ The following screen appears:



4. - Start spreading.

⇨ During application the number of pulses will be counted in the screen "CALIBRATION – main flow meter".

5. Apply a few hundred liters. Do not empty the container fully. This prevents air bubbles forming and distorting the result.
6. - Stop the spreading.

⇨ The application will be stopped.
⇨ No pulses are counted on the display.

7.

- Stop calibration.
⇨ A new line appears: "Water volume"

8. Determine the quantity applied. For example by weighing the tank before and after spreading and so working out the difference.

9. Enter the applied quantity in liters in the "Water volume" line.

10. - Leave screen.

⇨ You have calibrated the flow meter with the tank method.

7.3.2 Calibrating the flow meter with the nozzle method

During calibration of the flow meter with the nozzle method you determine the quantity of the liquid applied through a nozzle in a specific time.

Mode of operation

In the nozzle method water is applied through a nozzle over a specific time.

The flow meter measures the pulses during this time.

When you have stopped spraying, you must enter the quantity of water that was sprayed through the nozzle.

The computer works out the number of pulses per gallon.

⚠ CAUTION

Spray liquid or spray liquid residues
Danger of poisoning or burning

- Clean the spray liquid container thoroughly prior to calibration. The sprayer must be free of spray liquids or spray liquid residues.
- Use only clear water during calibration.
- Wear required protective equipment.

Procedure

☑ You have prepared a measuring beaker you can use to measure the quantity sprayed.

☑ You have prepared a stopwatch to be able to count one minute precisely.

☑ Only one section is preselected.

☑ Manual mode is activated (in the "Spray data" area of the work screen the icon appears).

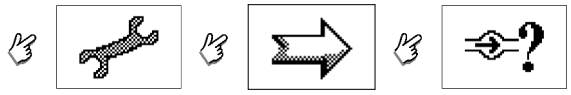
☑ The tank is filled with clear water.

☑ The set working width is correct.

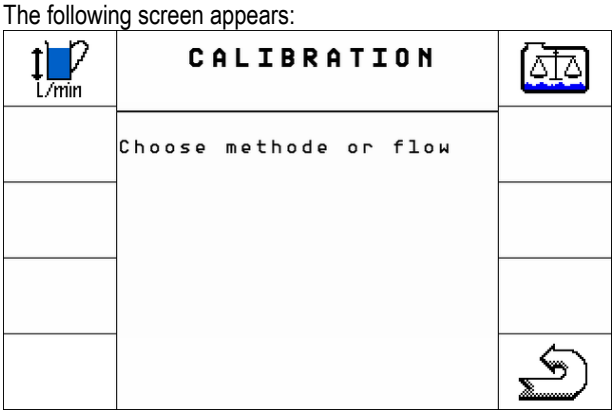
☑ The number of nozzles per section and the number of sections is entered correctly.

1. Make sure that all preconditions are fulfilled!

2. Switch to the "CALIBRATION" screen:



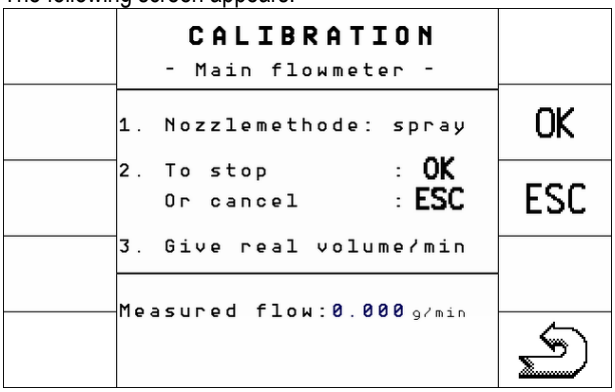
⇨ The following screen appears:



3.

- Select nozzle method.

⇨ The following screen appears:



⇨ The line "Measured flow" will display the previous flow rate.

4.

- Start spreading.

5. Go to one nozzle and for 60 seconds carefully collect the water sprayed by using the measuring beaker prepared.

6. Write down the water quantity sprayed.

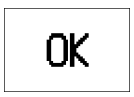
7. Repeat the last two steps on several nozzles.

8. Determine and note down an average of several measurements.

9.

- Stop applying.

⇨ The application will be stopped.

10. 

- Stop calibration.

⇨ Line "Real flow" appears.

11. Enter the average applied quantity in liters in the "Real flow" line.

12. - Leave screen.
    ⇨ The value of the parameter "Pulses main flow" will be updated.

⇨ You have calibrated the flow meter with the nozzle method.

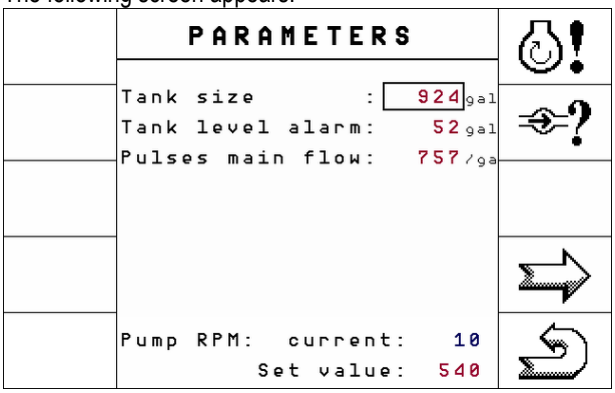
7.3.3 Manually entering the number of pulses per gallon for the flow meter

If you know the precise number of pulses per gallon for the flow meter, you can enter this value manually.

Procedure

1. Switch to the "Parameters" screen:

⇨ The following screen appears:



2. Enter number of pulses per gallon in the line "Pulses main flow".

7.4 Calibrating the wheel sensor

When should you calibrate?

- When you have fitted a wheel sensor (Sensor X) on the wheel of the tractor.
- Prior to initial startup.
- After changing tires.
- After tractor change (if the wheel sensor was fitted to the tractor's wheel).
- When the speed shown on the work screen is incorrect.
- When the traveled route shown on the work screen is incorrect.

NOTICE

Imprecise calibration
The speed cannot be precisely determined with an incorrectly calibrated wheel sensor.
As a result all the calculations of the area sprayed, the route traveled and the volume applied will be highly imprecise.

- Calibrate the wheel sensor very precisely.

7.4.1 Determining pulses per 300 feet

When calibrating the wheel sensor with the 300ft method, you determine the number of pulses received by the sensor in a distance of 100ft.

In order for the system to function correctly, the wheel sensor must receive at least 250 pulses over a distance of 300 feet.

To increase the number of pulses, you must mount additional magnets opposite of the wheel sensor.

If you know the number of pulses for the wheel sensor you can enter this number manually as well.

Procedure

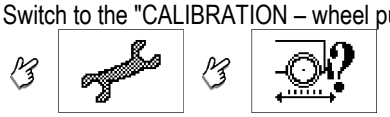
☑ Wheel sensor is mounted.

☑ All wheel sensor magnets are fully functional.

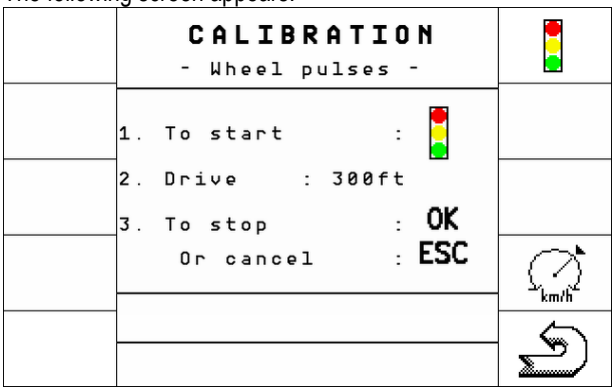
☑ A distance of 300ft has been measured and marked. The distance must correspond to the field conditions. It should therefore lead over a meadow or a field.

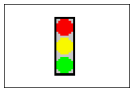
☑ The tractor with connected machine is operational for a 300ft drive and is at the start of the marked distance.

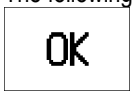
1. Make sure that all preconditions are fulfilled!
2. Switch to the "CALIBRATION – wheel pulse" screen:



⇨ The following screen appears:



3.  - Start calibration.
4. The following function icons appear:



- Stop calibration.

- Abort calibration.

5. Drive the previously measured 300ft distance and stop at the end.
   ⇨ During the drive, the currently determined pulses are displayed.
6.

- Stop calibration.
7. - Leave screen.

⇨ The number of pulses appears in the line "Wheel pulses"

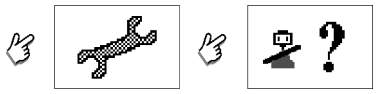
7.5 Configuring sections

7.5.1 Entering the number of sections

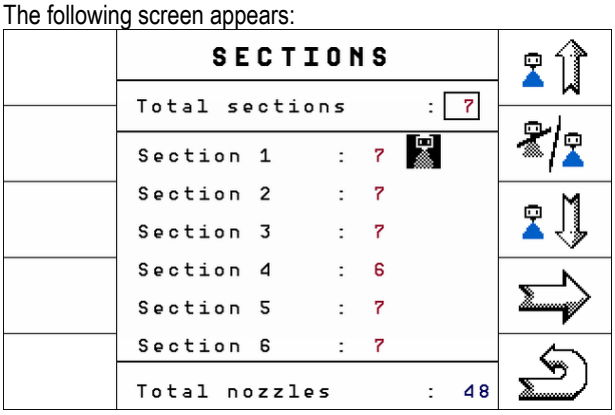
Procedure

Enter the number of sections as follows:

1. Switch to the "SECTIONS" screen:



⇨ The following screen appears:



2. In the line "Total sections" enter the number of sections.

7.5.2 Entering the number of nozzles per section

You must enter the number of nozzles installed on each section.

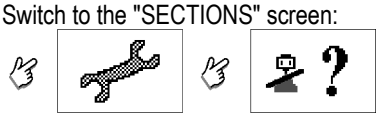
When to enter?

- Prior to initial startup.
- When the number of nozzles in a section is changing.

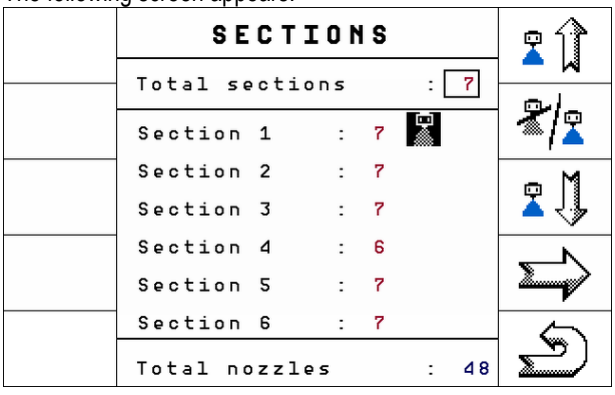
Procedure

Enter the number of nozzles per section as follows:

1. Switch to the "SECTIONS" screen:



⇨ The following screen appears:



⇨ Next to each section appears the number of nozzles.

2. - Set the number of nozzles that must be changed.

⇨ The data input screen appears.

3. Enter desired number of nozzles.
4. - Leave screen.

7.5.3 Switching off section permanently

You can permanently switch off any section.

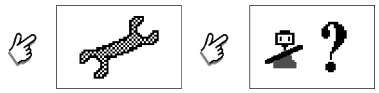
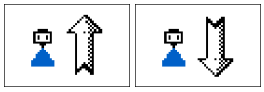
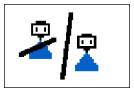
Effects

Switching off the outer sections has the following effects:

- The working width will be re-calculated. The working width will be reduced by the width of the sections that are switched off.
- With TRACK-Leader II: The newly calculated working width will not be taken into account by HEADLAND-Control.

Procedure

This is how you switch a section off permanently:

1. Switch to the "Sections" screen:
   
2.  - Select section.
   ⇨ The cursor symbol appears alongside the selected section:
3.  - Switch section on or off.

⇨ The cursor symbol appears alongside the section that was switched off:

7.6 Setting sprayer geometry

Sprayer geometry is set of parameters that describe the dimensions of your machine.

Setting the sprayer geometry lets the software know exactly how long and how wide the machine is and where the individual sections are located.

Sprayer geometry parameters

While setting the sprayer geometry you must measure the following parameters:

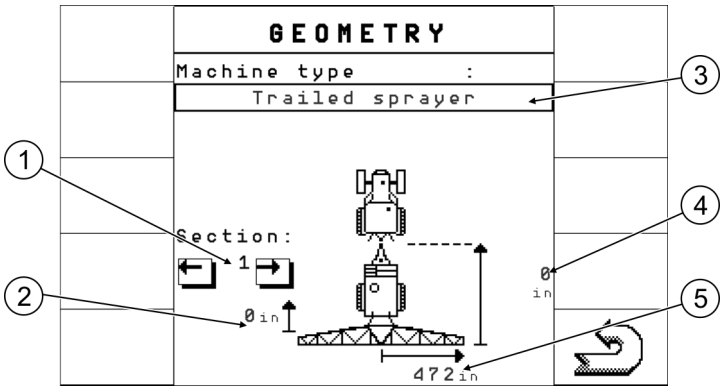
- CRP_X - On the diagram (4)
- DRP_Y - On the diagram (5)
- ERP_X - On the diagram (2)

The following table shows you where you measure these distances on different sprayers.

Type of sprayer	CRP_X (4)	DRP_Y (5)	ERP_X (2)
Trailed sprayer	Distance between the work point and the attachment point	Half the current working width	Only when there are sections on the sprayer that are closer or

Type of sprayer	CRP_X ④	DRP_Y ⑤	ERP_X ②
Mounted sprayer	Distance between the work point and the attachment point	Half the current working width.	further away from the GPS antenna than the work point: - Work out the distance between the work point and the particular section
Self-propelled sprayer, with rear boom	Distance between the work point and the GPS antenna	Half the current working width	
Self-propelled sprayer, with boom in front	Distance between the work point and the GPS antenna	Half the current working width	

The trailed sprayer is shown on the diagram. If you have activated another sprayer, it appears on the display.

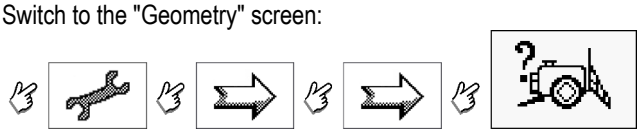


Sprayer geometry overview

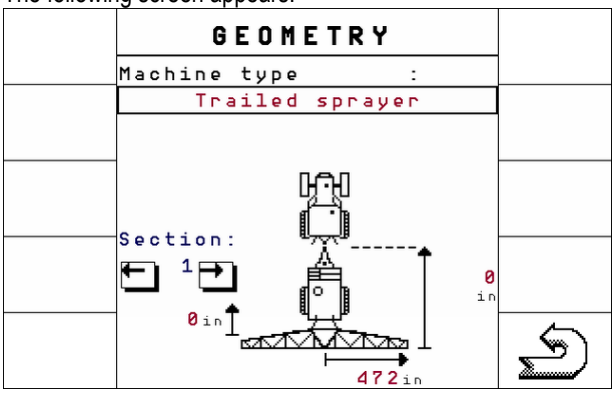
①	Number of sections that are further away from or closer to the GPS antenna than the work point.	③	Type of sprayer
②	ERP X	④	CRP X
		⑤	DRP Y

Procedure

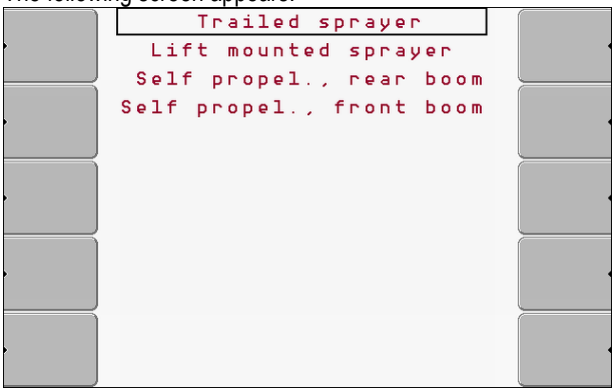
1. Starting the "Sprayer" application:
   | Sp (Number)
2. Switch to the "Geometry" screen:

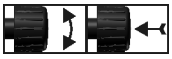


⇨ The following screen appears:



3. Press the rotary knob:
   ⇨ The following screen appears:



4. Click on your sprayer type.
   ⇨ A diagram of the sprayer appears.
5. Measure following distances on the sprayer:
   CRP_X, DRP_Y, ERP_X
6.  - Enter the values in the fields one after another.

7.7 Tank filling

After each fill-up of the spray liquid tank, you can tell the job computer how much water you added.

Methods

Depending on what additional equipment is fitted to your sprayer, the process may be different.

In this you can:

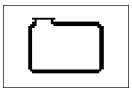
- Fill up the tank manually without any additional systems
- Fill up the tank with TANK-Control

7.7.1 Filling up the tank manually without additional systems

If you fill up the spray liquid container manually without any additional systems, you need to enter the new tank content manually on the display.

Controls

Function icon	Function
	Tank was fully filled up.

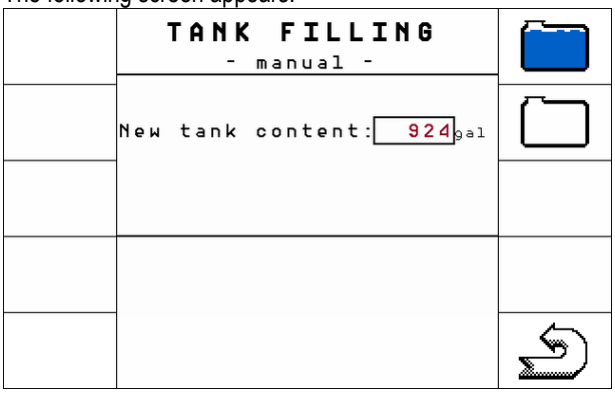
Function icon	Function
	Set tank content to 0 gallon.

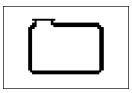
Procedure

Enter the new tank content in this way if you have fully filled up the liquid container:

1. Switch to screen "Tank filling – manual":

   ⇨ The following screen appears:

2.  - Set tank content back to 0 gallon.
3. - Enter full tank

   or

4. In the field "New tank content", enter the tank content after the fill-up.

⇨ The new tank content appears in the work screen, in the tank data area.

8 Operating the job computer SC-Box in the field

8.1 Controlling application

In this section you learn how to use the functions of the job computer that are needed for spraying.

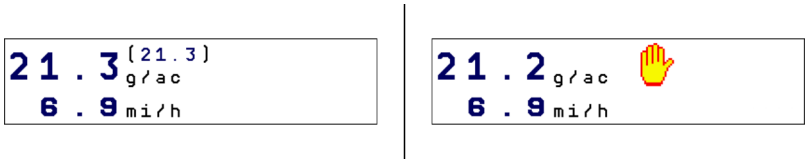
8.1.1 Changing application mode

The job computer lets you work in two modes:

- In automatic mode – the application rate will be adapted to the speed.
- In manual mode - the application rate will not be regulated automatically.

Illustration

On the following diagram you see how this function is shown on the work screen:



Left: Automatic mode, right: manual mode

Controls

Use the following function keys to operate the function:

Switch between manual and automatic mode

Using Automatic mode

In automatic mode, the job computer controls the spray pressure and the sections' main switch so the rate is reached.

You are in automatic mode when one of the following icons appears in the spray data area of the work screen:

Icon on the work screen	Meaning
Rate appears in brackets	Sprayer can apply. The spray pressure will be regulated so that the rate is achieved.
	The speed of the sprayer is below "Minimum speed". Sprayer can apply. Spray pressure is not regulated.
	The speed of the sprayer is below "Min Auto speed". Sprayer automatically switches off.

Mode of operation

The spray pressure will be adjusted automatically in the following cases:

- Speed of the sprayer has changed.
- Number of switched-on sections has changed.
- You have changed the set value manually.

The speed and precision the rate will be adjusted with depends on the value of the parameter "Regul. factor".

You can change the set value manually while driving in Automatic mode.

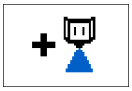
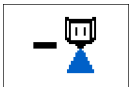
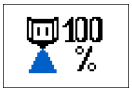
Prerequisites

To use automatic mode, the following conditions must be fulfilled:

- Rate has been entered.
- Flow meter is calibrated.
- Wheel sensor is calibrated.
- Working width is set.
- The speed of the sprayer is higher than the set "Min Auto speed".
- The parameter "Regul. factor" has been set.

Controls

To operate this function the user needs the multi-function joystick first of all.

Function icon	Function
	Increase rate by 10%
	Reduce rate by 10%
	Set rate to 100%

Changing application rate in manual mode

When the sprayer is in manual mode the application is not regulated according to a specified rate. The application rate must be set manually instead.

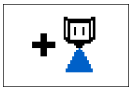
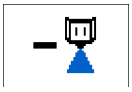
The application is in manual mode when the following icon appears in the spray data area of the work screen:

Application in manual mode

Controls

To operate this function the user needs the multi-function joystick first of all.

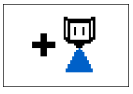
Use the following function keys to operate the function:

Function icon	Function
	Increase application rate.
	Reduce application rate.

Procedure

You can increase the spread rate as follows:

☑ Manual spreading mode is active.

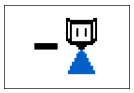
1.  - press and keep pressed.

⇨ As long as the button is pressed, the regulation valve is continuously closed further. The spread rate continuously increases.
⇨ The current value in the "Spray data" area of the work screen is increased.

Procedure

You can reduce the spread rate as follows:

☑ Manual spreading mode is active.

1.  - press and keep pressed.
   ⇨ As long as the button is pressed, the regulation valve is continuously opened further. The spread rate reduces.
   ⇨ The current value in the "Spray data" area of the work screen is reduced.

8.1.2 Starting spreading

Procedure

Start spreading as follows:

☑ The tractor with the sprayer is on the field.

☑ You have configured the job computer.

☑ You have folded out the boom.

1. Make sure that all preconditions are fulfilled!
2.

- Start spreading.
   ⇨ In Manual mode:
   The sprayer begins to spread.
   Spray cones appear below the boom icon:

   ⇨ In Automatic mode:
   the sprayer is ready for spreading.
   As long as the sprayer does not move, the icon appears in the work screen.
3. In Automatic mode:
   Start up and exceed minimum auto speed (Parameter "Min. Auto speed").
   ⇨ As soon as the minimum auto speed is exceeded, the sprayer starts to spread.
   Spray cones appear below the boom icon:

⇨ You have started the spreading.

8.1.3 Stopping spreading

You can stop spreading in the following ways:

-

- stop the spreading.

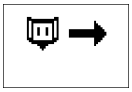
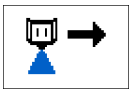
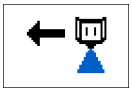
- - switch off all sections.
- Move slower than the set minimum speed (only in Automatic mode).

8.1.4 Operating sections

Controls

To operate this function the user needs the multi-function joystick first of all.

Use the following function keys to operate the function:

Function icon	Function
	Switch off sections from left to right
	Switch off sections from right to left
	Switch on sections from left to right or When all sections are switched off, only then switch on the first section on the left.
	Switch on sections from right to left or When all sections are switched off, only then switch on the first section on the right.

8.1.5 Dealing with weed infestations

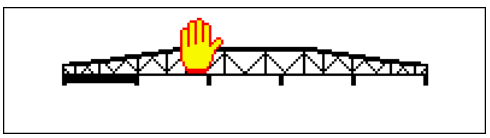
"Localized mode" is designed for the targeted treatment of small weed infestations.

In contrast to normal mode, in localized mode you can switch individual sections on and off, even when they are not adjacent to one another.

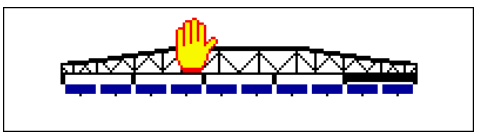
Work screen in localized mode

The work screen in localized mode differs slightly from the normal work screen.

In the boom display a cursor bar appears below the boom:



Cursor bar fully to the left



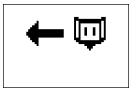
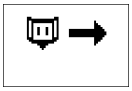
Cursor bar fully to the right

Preselecting and switching off sections in localized mode

Regardless of whether the sprayer is applying, you can move the cursor bar below any section and change the section's state.

Controls

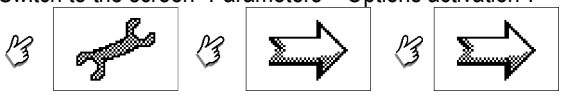
Use the following function keys to operate the function:

Function icon	Function
	Move cursor bar to the left
	Move cursor bar to the right
	Preselect or switch off marked section
	When some sections are preselected, start spreading on these sections
	When no sections are preselected, start spreading on all sections

Activating localized mode

Procedure

1. Switch to the screen "Parameters – Options activation":

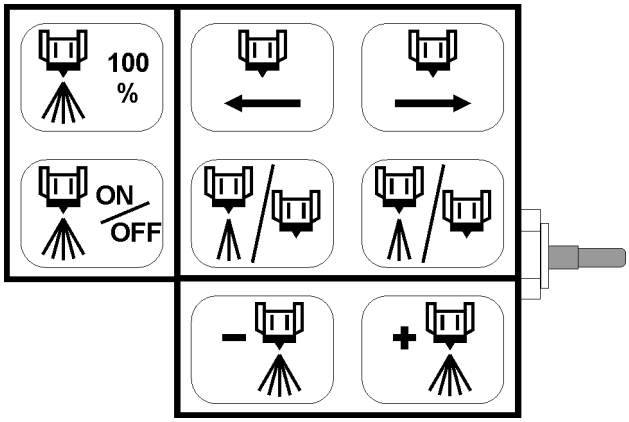


2. Click on the value under the line "Section switching".
   ⇨ A list appears.
3. Click on "Localized mode".
   ⇨ Under the line "Section switching" the value "Localized mode" appears.
4. - Restart display.

⇨ Localized mode is active after the restart.

Multi-function joystick in localized mode

In localized mode the assignment of buttons on the multi-function joystick changes:



Button assignment in localized mode

8.2 Documenting work results

You can document your work in the "Counters" screen.

In the "Counters" screen there are two types of counter:

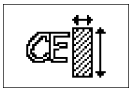
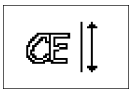
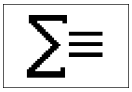
- Day counter – documents the work until it is deleted.
- Total counter – documents the work since first start-up.

The "Counters" screen has the following information:

- **Volume** – applied volume.
- **Area** – area processed.
- **Distance** – distance driven during the application.
- **Work time** – Total duration of the application.

Controls

Use the following function keys to operate the function:

Function icon	Function
	Clear "Volume" counter
	Clear "Area" counter
	Clear "Distance" counter
	Clear "Work time" counter
	Back to work screen
	Delete the contents of the day counter shown
	Stop day counter - The record of the work will be maintained until the display is restarted or the function button is pressed again. - The icon blinks on the work screen:

9 Maintenance and technical data

9.1 Technical data for SC-Box job computer

Technical data of job computer SECTION-Control Box

Power supply:	9 - 16 V DC
Power consumption:	340 mA (at 13.8V without power output, without supply to external sensors)
Temperature range:	-20 to +70 °C (in accordance with IEC68-2-14-Nb, IEC68-2-30 and IEC68-2-14Na)
Housing:	Aluminum continuous casting housing with plastic cover
Protection degree:	IP43
Dimensions:	8.66 inch x 8.66 inch x 2.48 inch + cable
Weight:	3100g

9.2 Preparing system for winter rest

This is how you prepare the system for the winter:

1. Disassemble the SC-Box, the display and the on-board computer.
2. Store the SC-Box, the display and the on-board computer in a warm and dry place over winter.

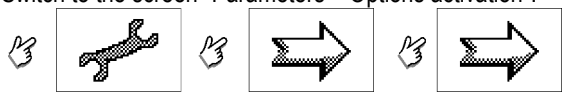
9.3 Checking the software version

In the Sprayer job computer application you can check the following versions of the software:

- SPRECO1: Software version on job computer SC-Box
- OP: Version of the object pool used.

Procedure

1. Switch to the screen "Parameters – Options activation":



2. The currently installed software version appears on the lower edge of the screen.

9.4 Fault diagnostics

9.4.1 “Simulated speed“ function

The simulated speed function is only used during tests and when looking for faults. It simulates the movement of the machine when the machine is still.

By activating the "Simulated speed" function it is possible for customer service employees to check the correct function of a sensor.

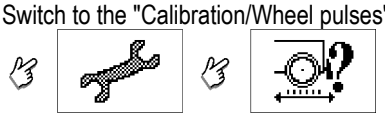
By default the value is set to 0 mph and the function is switched off.

After a restart of the computer the function is always deactivated.

The most recently set value is saved and used during the next activation.

Procedure

1. Switch to the "Calibration/Wheel pulses" screen:



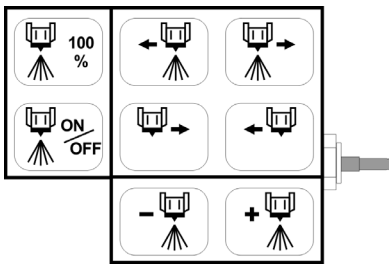
2. - Activate simulated speed.
   ⇨ Line "Simul. speed" appears.
3. - Call up data input screen.
4. In the data input screen, enter the speed that should be simulated.
5. - Leave screen.

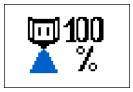
⇨ The set speed appears on the work screen.

9.5 Multi-function joystick button assignment

The following diagram shows which functions are activated when you press a specific button on the multi-function joystick.

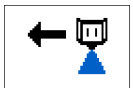
The diagrams also show what position the side switch must be in:



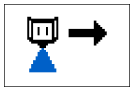


Set rate to 100%.

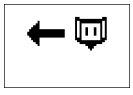
Switch section main switch on and off.



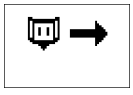
Switch on sections from right to left



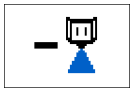
Switch on sections from left to right



Switch off sections from right to left

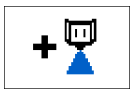


Switching off sections from left to right



In automatic mode: Reduce rate by 10%

In manual mode: Reduce application rate.



In automatic mode: Increase rate by 10%

In manual mode: Increase application rate.

10 Alarm messages

It may occur that a warning message or warning symbol appears on the display screen during work.

- Warning symbols appear in the header of the work screen.
- Warning messages appear in a pop-up window.

The following table lists possible error messages and a short help for troubleshooting.